

Activity-based interventions to increase independence after stroke within the hospital setting: Protocol for a systematic review

Tayla Grant, Laura Jolliffe, Kylie Wales, Emma Schneider, Avril E. Drummond,
Natasha A. Lannin

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Tayla Grant^{1, 2} BHSc, MOTPrac; Laura Jolliffe^{1, 3, 4} BOccTherapy(Hons), PhD; Kylie Wales^{1, 5} BAppSc(OT)hons, PhD; Emma Schneider^{2, 6} BBNSc, MOT, PhD; Avril E. Drummond⁷ Dip COT, MSc, PhD; Natasha A. Lannin^{1, 2} FOTARA, FAOTA, GCIS, BSc, PhD

¹ Monash University Melbourne AU

² Alfred Health Melbourne AU

³ Peninsula Health Frankston AU

⁴ National Centre for Healthy Ageing Melbourne AU

⁵ Australian Catholic University Sydney AU

⁶ Department of Allied Health Swinburne University of Technology Melbourne AU

⁷ University of Nottingham Nottingham GB

Corresponding Author:

Natasha A. Lannin FOTARA, FAOTA, GCIS, BSc, PhD

Monash University
99 Commercial Rd
Melbourne
AU

Abstract

Background: Stroke is a leading cause of disability, commonly resulting in difficulty completing basic and instrumental activities of daily living. Rehabilitation is recommended to improve functional performance, however it remains unknown whether early (hospital-based) intervention is effective nor the intervention components that should be delivered.

Objective: We propose a systematic review to summarize the evidence for the effectiveness of activity-based interventions, led by occupational therapists, for improving performance of basic activities of daily living (b-ADL) or simple cognitive instrumental activities of daily living (C-IADL) by adults with stroke. Reviewing simple C-IADLs as opposed to instrumental activities of daily living will allow us to review interventions for activities with similar executive functioning demands. By identifying effective interventions, we aim to improve outcomes for stroke survivors by maximizing independence during hospitalization.

Methods: Searches will be conducted in MEDLINE, CINAHL, EMBASE and Cochrane Controlled Register of Trials. We will include randomized controlled trials and quasi-randomized controlled trials which include adult stroke survivors and which are testing interventions (delivered in the hospital setting) that aimed to improve or promote independence in b-ADL or C-IADL activities. Two reviewers will independently screen full text articles and one reviewer will extract data, with a second reviewer providing confirmation. The PEDro Scale will be used to assess methodological quality of studies. Cochran Q test will assess heterogeneity among studies, then where appropriate, meta-analysis will be performed. Measures of outcome may include global rating of function (such as the Functional Independence Measure, FIM™) or specific task performance assessments (such as the Nottingham Dressing Assessment).

Results: Results will be presented based on subgroup analyses where able, including activity type (activity or occupation level), time post-stroke (within or greater than 1 week), and delivery of intervention (group or individualized).

Conclusions: This systematic review will address the current gap in the literature regarding activity-based interventions for stroke survivors, within the inpatient setting, and provide clinical guidance on the most effective methods, if any, for improving independence early after stroke. Clinical Trial: PROSPERO, <https://www.crd.york.ac.uk/prosperto/> (Registration ID: CRD42024562195)

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Original Manuscript

Activity-based interventions to increase independence after stroke within the hospital setting: Protocol for a systematic review

Abstract

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International Registration: PROSPERO, <https://www.crd.york.ac.uk/prospero/> (Registration ID: CRD42024562195)

Keywords: stroke; rehabilitation; activities of daily living; occupational therapy; stroke rehabilitation; hemiplegia

Introduction

Stroke is a leading cause of adult disability [1]; despite advances in acute treatments the need for neurorehabilitation to address this continues [2, 3]. Stroke-related impairments can lead to difficulties in performing meaningful activities, such as showering or preparing a meal, and problems in participating more broadly in life, such as maintaining a home. Previous studies have shown that around two thirds of all survivors of stroke experience a disability that impacts their ability to complete activities of daily living (ADL) [4]. ADLs are the everyday tasks completed by an individual and are often divided in multiple domains, including basic activities of daily living (b-ADL), and simple and complex cognitive instrumental activities of daily living (C-IADL). Basic ADLs “rely heavily on physical abilities and procedural memory” [5] such as self-feeding, dressing, grooming and showering. Whereas, simple C-IADL are tasks which “are more familiar, contain fewer steps and require less planning or problem solving” [5] such as preparing a hot drink, preparing a simple meal or folding clothing. Complex C-IADLs are “more novel, less predictable, and place greater demands on multitasking, planning, decision making, and problem-solving capacities” [5] such as organizing and managing medications, planning an event or creating a budget for an extended period of time.

Effective rehabilitation enables stroke survivors to achieve optimal functional outcomes across all areas of their life [4]. Occupational therapists assess and deliver rehabilitation for stroke survivors who have experienced changes to their ability to engage in meaningful everyday activities as a result of their stroke impairments [6]. Occupational therapy interventions often target ADLs to improve functional performance [7].

Stroke survivors should receive intensive rehabilitation throughout their inpatient stay to support a meaningful recovery [4] and promote neuroplasticity [3]. Previous research has explored the effectiveness of occupational therapy rehabilitation for stroke survivors on ADLs within the community setting [8]. The results highlighted that, stroke survivors who received occupational therapy within the community specifically targeting ADLs, had increased levels of ADL independence [8]. Research however has been limited in the effects of activity-based interventions alone within the inpatient setting [9]. Of the available evidence, a recent systematic review, found that occupational therapy specific interventions within the inpatient setting did not have a significant effect on improving quality of life and activity performance of stroke survivors [10]. However, the authors recommended results be used with caution given that the control and experimental group provided occupation specific interventions [10]. Additional evidence suggests that intensive hospital rehabilitation correlates with improved ADL performance on discharge, however literature is limited on the effectiveness of occupational therapy specifically for stroke survivors within the hospital setting [9].

Therefore, the systematic review will synthesize activity-based intervention studies that aim to improve performance of b-ADL and/or simple C-IADL within the hospital setting in stroke survivors. Complex C-IADLs were excluded from this review as the demands of these tasks were identified to be significantly different to b-ADL and simple C-IADLs. The guiding research question developed was: Do occupational therapy led activity-based interventions designed to target b-ADLs and /or simple cognitive instrumental activities of daily living (C-IADL) within the hospital setting increase functional independence in stroke survivors?

Method

Study Design

The protocol was developed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) statement [11]; the PRISMA statement will guide reporting of the completed systematic review. The protocol has been registered in the International Prospective Register of Systematic Reviews (PROSPERO): CRD42024562195

Eligibility Criteria

The primary objective of this review is to synthesise effectiveness research on rehabilitation interventions delivered in the hospital setting to improve independence after stroke. We will include publications from any date in our search.

Types of studies

Studies will be included if they are full publications of randomized controlled trials (RCTs) and quasi-randomized controlled trials.

Population and setting

Studies that include adults (aged ≥ 18 years) diagnosed with stroke who are inpatients within the hospital setting will be included. Studies involving mixed diagnoses will be included where the data from those with a diagnosis of stroke are able to be extracted, or where $\geq 75\%$ of the participants have a diagnosis of stroke. Studies involving mixed aged groups will be included where the data from those aged ≥ 18 years are able to be extracted, or where $\geq 75\%$ of the participants are aged ≥ 18 years. Studies will be excluded if they are relating to people who reside in the community setting, including care-based facilities (e.g. residential aged care).

Intervention

Studies which provide an activity-based intervention completed within the hospital setting, that fit within the scope of being delivered by an occupational therapist will be reviewed. Retraining interventions specific to b-ADL and simple C-IADL will be included within our systematic review. Both compensatory and remedial rehabilitation strategies will be included. We will exclude community-based interventions and computer based/virtual reality intervention, given the focus of the systematic review is to review the effects of real-life training within the hospital environment.

Comparison interventions

Included studies may have either an inactive comparison (where the control group received no occupational therapy input) or an active comparison, such as those where participants received another occupational therapy intervention which was not specific to activity-based activities of daily living retraining or non-descriptive intervention within the control group. Examples of this include impairment based upper limb treatment or visual scanning re-training.

Outcomes

We will record the outcome measures which included studies used to report outcomes related to b-ADLs and simple C-IADLs, to determine the effectiveness of activity-based interventions on stroke survivors' functional independence. All clinical measures used to evaluate the effectiveness of activity-based interventions will be considered. Outcome measures may be reported as a global measure of function such as the FIM™, or specific evaluation of b-ADL or simple C-IADL such as the Nottingham Dressing Assessment or Barthel Index.

Table 1 provides the summary of eligibility scores that will be shape the search terms and identify relevant studies.

Table 1: Eligibility Criteria

PICOS	Inclusion Criteria	Exclusion Criteria
Participants	At least 75% aged 18 and over with a diagnosis of stroke.	
Intervention	Activity-based retraining (b-ADLs or simple C-IADL) Intervention delivered in inpatient setting.	Computer based / virtual reality retraining Community based interventions
Comparison	No occupational therapy input, no allied health or received occupational therapy not specific to activity-based ADL retraining or intervention not defined in the control group	
Outcomes	1: Determine the effectiveness of activity specific interventions (b-ADL and/or simple C-IADL) on stroke survivors functional independence. 2: Identify and describe the assessments and occupational therapy interventions designed to target b-ADL and simple C-IADLs, currently being used with adult stroke survivors in the hospital setting.	
Study Design	Randomised controlled trials Quasi-randomised controlled trials	

Search Strategy

Electronic searches will be conducted in CINAHL, EMBASE (via Ovid) and MEDLINE. The search

strategy will be developed with senior researchers. The search strategy will include key terms such as stroke, hemiplegia, activities of daily living, activity-based interventions, and hospital. During screening at title and abstract, English only language will be included due to no access to translation.

Procedures

All studies identified by the search strategy will be uploaded to Covidence [12] and duplicates removed. All articles will be screened at title and abstract by one reviewer, in line with the exclusion and inclusion criteria. Duplicate studies (i.e. those with the same authors, setting, location and interventions) will be removed. All excluded articles at title and abstract will be reviewed by a senior researcher to ensure no articles were inadvertently excluded. Full text articles will then be reviewed by two research team members. If there are conflicts in decision making, a third research team member will be consulted for a third review. Authors of studies may be contacted if there is missing information or further detail is required to ensure articles are not inadvertently excluded or included. Details of the data screening will be presented in a PRISMA study flow chart.

One reviewer (TG) will extract data using a predetermined form; all data extraction will be confirmed by the senior author (NAL). If discrepancies occur, these will be resolved by discussion between authors. If not resolved, a third author will independently extract the data. The data extraction form will extract variables necessary for describing the study and conducting data analysis, including:

1. Title of paper
2. Author Names
3. Year the study was completed
4. Study design (eg. RCT or quasi-randomised controlled trial)
5. Country the study was completed
6. Participant age and sex
7. Primary and secondary assessments used
8. Intervention/Comparison details (according to the TIDieR checklist items [13]),
9. Outcomes and results (number of participants in analysis, summary data for each intervention group, estimate of effect along with measure of variability, e.g. mean difference and 95% confidence interval around the estimate).

The PEDro scale will be used to critically appraise the studies to examine any risk of bias [14]. The PEDro score on OT seeker or PEDro will be used if available, however, if not available online it will be completed by two reviewers separately. If disagreements regarding results, these will first be attempted to be resolved between the two reviewers, if unable to reach a consensus a third reviewer who is a senior researcher in the research team will review and make the final decision.

Statistical Analysis

A meta-analysis will be completed to compare the effect between the treatment and control groups. RevMan will be used to conduct a statistical analysis to calculate effect measures. The treatment effect measure will be determined by the data located. For instance, continuous data may be calculated using the Standard Mean Difference (SMD), and confidence interval (CI) 95% when studies are measuring the same concept however have used a different measurement scale. The mean difference (MD) and confidence interval (CI) 95% may be used when the results are expressed using the same measurement scale. The impact of heterogeneity will be reviewed. If results are too dissimilar, a sensitivity analysis will be considered, and then a narrative synthesis will alternatively be considered.

Results

Results will be discussed based on subgroup analyses where able, including activity type (activity or occupation level), time post-stroke (within or greater than one week), and delivery of intervention (group or individualized). Data extraction and analysis will be completed by end of February 2025, the results of the study and the submission of a manuscript for peer review are expected in April 2025.

Discussion

Overview

The findings from this systematic review will aim to address the gap in the literature regarding activity-based interventions for stroke survivors in the inpatient setting. Clinicians will be able to use the results to make evidence-informed decisions regarding activity-based interventions and rehabilitation for reducing long-term disability.

Limitations

This review will only search for and synthesize studies published in English; this limitation will be acknowledged in the systematic review publication. We acknowledge that the heterogeneity of the intervention types and of the clinical measures used to evaluate independence may not permit direct comparisons between studies. These limitations are not uncommon in systematic reviews of complex interventions.

Comparison with Prior Work

Prior reviews [10] did not systematically synthesize intervention effects from only those studies which delivered activity-based interventions with the goal of increasing independence. Findings will therefore allow reliable conclusions regarding such interventions to be determined. Consistent with the prior work, we will use a validated tool (PEDro) to assess the quality of evidence.

Conclusion

This systematic review will provide a detailed summary of the current evidence for the effectiveness of activity-based interventions on functional independence for stroke survivors. The findings of this review will guide clinicians in their selection of rehabilitation interventions, and enable researchers to determine future evidence needs. Synthesis of published effectiveness trials will not only support evidence-based practice from an occupational therapy perspective, but will also guide future trial design, given the limited overall research available to date within the inpatient setting.

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Data Availability

The data generated and analyzed during this study will include content extracted from published, peer-reviewed journal articles. Additional data generated and analyzed during the study will be available from the corresponding author upon reasonable request.

Authors' Contributions

Conceptualization: TG, LJ, NAL (equal)

Investigation: TG (lead), LJ, NAL (equal)

Methodology: TG, LJ, KW, NAL (equal); ES, AED (supporting)

Project administration: TG (lead)

Writing – original draft: TG (lead), LJ, KW, NAL (supporting)

Writing – review & editing: TG (lead), LJ, KW, ES, AED, NAL (equal)

Conflicts of Interest

None declared.

Abbreviations

ADL: Activities of daily living

b-ADL: Basic activities of daily living

C-IADL: Cognitive instrumental activities of daily living

JMIR: Journal of Medical Internet Research

RCT: randomized controlled trial

SMD: standardized mean differences

CI: confidence interval

MD: mean difference

PEDro: Physiotherapy Evidence Database

TIDieR: Template for intervention description and replication

PRISMA-P: Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses PROSPERO:

International Prospective Register of Systematic Reviews

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